



THE ASSISTANT SECRETARY OF THE NAVY
(Research, Development and Acquisition)
WASHINGTON, D.C. 20350-1000

AUG 01 2005

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Surface Ship Topside Design Principles Publication

This memorandum publishes the attached Integrated Topside Design (ITD) Principles. The principles include the ITD Process, ITD Description and ITD Requirements Worksheet and address shipboard Topside installations and alterations. Development of policy instructions to provide direction and guidance to implementers of ITD Principles was coordinated. Resulting actions for organizations are identified below.

All Ship and System Program Managers are directed to implement the ITD Principles. Systems Command Commanders and Program Executive Officers (with Topside responsibilities) shall execute the ITD process and description along with the Topside Design Data Requirements Worksheet. To support this execution, the actions below shall be accomplished by designated Organizations.

Commander, Naval Sea Systems Command (COMNAVSEASYSCOM), as Topside Technical Authority, shall:

- Formalize Topside Technical Authority, Warrant Holder, and Engineering Agent appointments.
- Complete Topside Certification Process.
- Complete development of Topside Technical Design Requirements.
- Complete development of the instructions for using the ITD Principles and the Certification Process.
- Complete ITD process for new construction ships (including CVN Refueling Overhaul).
- Tailor the Integrated Topside Principles to Programs.

Systems Commands (NAVSEA, Space and Naval Warfare Systems Command, Naval Air Systems Command, and Marine Corps Systems Command) shall:

- Develop organizational Topside instructions for using the ITD Principles.
- Develop organizational Topside instructions for implementing the Topside Certification Process.
- Participate in Topside Technical Authority development process until technical authority is formalized.

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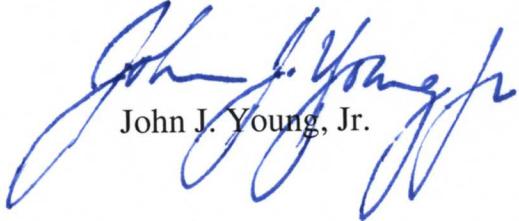
- Participate in Topside technical design requirements development process.

Program Executive Officers (with topside responsibilities) shall:

- Participate in the development of the Topside Certification Process.
- Assist the Topside Technical Authority in tailoring the enclosed ITD Principles as necessary to support Topside certification of programs under their respective cognizance.
- Assess and program for anticipated Topside requirements.
- Participate in Topside Technical Design development requirements.
- Implement the ITD principles for programs under their respective cognizance.

The final due date for implementation of all actions is 30 September 2005.

This Memorandum will remain in effect until superseded or incorporated into formal Topside instruction. My point of contact for this policy implementation is Mr. Carl Siel (SES), ASN (RD&A) Chief Engineer. He can be contacted at (202) 781-3971 or at carl.siel@navy.mil.



John J. Young, Jr.

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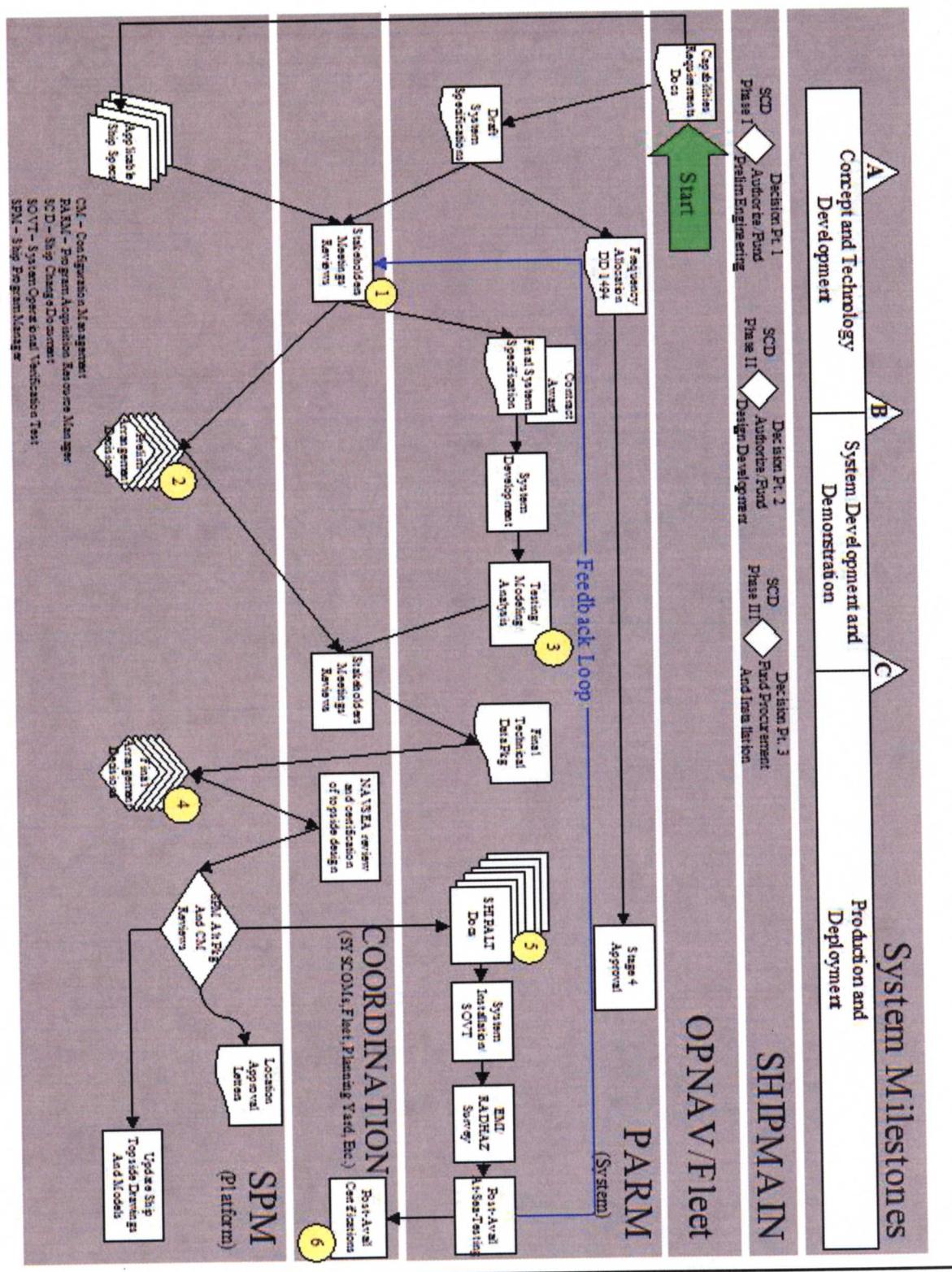
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Integrated Topside Design Process and Description



SHIPMAIN and the Integrated Topside Design Process

- Topsid Design is Part of the Technical Assessment
 - Design Progress and Readiness will be Assessed
- Progress of Topsid Design to be Included in Each SCD at Decision Points
 - More informed SHIPMAIN Voters
- All Topsid Changes will be Engineered and Certified
 - Reduce historical installation and unintended impact to ship & safety problems
 - Reduce post-installation rework or relocation: save time and money

Specification Development

- Operational Requirements Driven by the Fleet; Provided by OPNAV N7 to PEOs (SPMs and to Acquisition Program Managers)
 - Ship/warfare system requirements derived from Operational Requirements
 - Ship Capabilities Requirements
 - Current Ship Specification
 - Mission/Warfare System Requirements
 - System Capability Requirements
 - Draft System Specification Development

Preliminary Stakeholders Meeting(s)

- Goal Is to Align Mission/Warfare System/Element Specs With Ship Specs and Ensure All Stakeholders Understand Each Others Unique Requirements
- Draft System/Element Specification Is Reviewed by all Stakeholders
- Candidate Stakeholders
 - Topsid Warrant Holder, Topsid Engineering Agent (EA), Warfare System Engineers, System/Element Acquisition Program Managers (Multiple Systems and Elements Can be Addressed), Appropriate SPMs (Multiple Ship Classes Can be Addressed), Fleet Forces Command, Appropriate Type Commanders, Applicable SYSCOMs (NAVAIR, NAVSEA, SPAWAR), Design Activities, Planning Yards, and Ship Design Manager

System Development and Demonstration

- Goal Is to Design, Develop, and Test Systems/Elements Per Specs Agreed Upon by Stakeholders

- The Topside Warrant Holder will provide tailored Topside Requirements flowdown to system/element level Acquisition Program Managers.
 - The Topside EA will coordinate with Warfare System Engineers and other key representatives to ensure all requirements are identified
- Acquisition Program Managers (at System/Element Level)
 - Develop Final System/Element Specification and Award Contract for their system/element
 - Conduct System Development
 - Submit DD 1494 (Application for Equipment Frequency Allocation)
 - Conduct Testing, Modeling, and Analysis of their systems.
 - First Article Testing
 - Shipboard Interface and Compatibility Verification

Preliminary Arrangement Options

- Goal Is to Develop Initial Topside Study With Location Options
 - The Topside EA will use Preliminary Systems Specifications, Existing Ship Configurations, Studies, Analysis, and Historical Data
 - i.e. System Performance, Blockage Analysis, EMC Quicklook, Weapon Systems Impacts, Structural Impacts, Deck Operations and Evolutions Impacts, etc
 - Warfare System Engineers will evaluate locations for optimum mission effectiveness and warfare system trade-offs
 - Topside Engineering Agent will Publish Preliminary Report to Stakeholders

Final Stakeholders Meeting(s)

- Goal Is to Communicate Location Options and Present Results of Detailed Studies
 - Minimum of Two Meetings
 - Meeting 1:
 - Acquisition Program Manager to Communicate Any Changes to System/Element Requirements; SPM to Communicate Any Changes In Ship Requirements
 - Acquisition Program Manager to Present Results of First Article Testing and Shipboard Interface and Compatibility Verification

- Topsid EA to Present Preliminary Location Options
- Warfare System Engineer to evaluate location options for optimum mission effectiveness and warfare system impacts
- Downselect of best option; begin performing Detailed Studies

Meeting 2:

- Topsid Engineering Agent Presents Results From Detailed Studies
 - Warfare System Engineer Analysis - Combat System Performance evaluation
 - Radar Cross Section - Modeling, Test and Evaluation, etc
 - Special Studies - Blast/Overpressure, Weapon System Impacts, etc
 - EMI/EMC Analysis - Source/Victim Analysis, Brass Model, RADHAZ, etc
 - Structural Analysis - Shock/Vibe, Weight/Moment, System Stability, etc
 - Aviation System Impacts
- Final Location Option/Trade-offs Discussed
 - Operational Performance vs. Risk Impacts as Dictated by OPNAV Requirements and Fleet Concurrence
 - Warfare System Engineer to evaluate the final location option for optimum mission effectiveness and warfare system impact.
 - Should decisions require a deviation in mission/warfare requirements, the applicable NAVSEA Warrant Holder will review and provide a technical recommendation.
 - If changes are required in a warfare/mission performance requirement, NAVSEA OO and the applicable OPNAV sponsor will adjudicate.
- Final Location selected

Final Arrangement Decision

- Goal Is for NAVSEA Topsid Warrant Holder to Review and Approve the Final Arrangement Decision
- NAVSEA Topsid Certification
- Topsid EA delivers Final Topsid Report
 - Reference Past Studies and Analysis Documentation

- Approved System Location (Ship Class Specific)
 - Test and Analysis Results
 - Assumptions
 - Risk Assessment
- Codify Decision by SPM Issuing "Location Approval Letter"
 - Endorsement of Topside EA Final Report
 - Topsid EA Final Report included as Enclosure

Installation and Testing

- Acquisition Program Managers
 - Develop SHIPALT Documents for the system/element in question
 - Ship Installation Drawing (SID)
 - Integrated Logistic Support (ILS) Cert
 - Conduct System Installation and SOVT
 - Arrange EMI/ RADHAZ Surveys
 - Conduct Post-Availability At-Sea Testing

Feedback Loop

- Goal Is Allow for Feedback to the Process Based on:
 - At-Sea Testing
 - EMI/RADHAZ Surveys
 - Other Post-Install Testing and Analysis
- Any negative feedback is provided to all Stakeholders for evaluation
- Stakeholder meetings held to Present Results of Feedback evaluation
 - Evaluation could result in
 - Change in Location Decisions
 - System Contract Modifications
 - Engineering Change Proposal (ECP), Field Change (FC)

Certification

- Goal Is to Conduct System Certifications by cognizant authority Prior to Ship Deployment
 - System Electromagnetic Compatibility (EMC) Certification
 - NAVAIR Certifications
 - Pointing and Firing Cut-outs (P&FCO)
 - Radiation Hazard (RADHAZ) Cert
 - Etc.
- Certification provided to system or element Acquisition Program Manager

Update Models and Drawings

- SPM is responsible for ensuring Ship Topside Models/Drawings Include the Latest Topside Changes
 - Paramount for Proper Execution of Future Studies and Topside Planning
 - Success is Determined by Sophistication and Accuracy of Modeling and Software Programs Used; Reduces Granularity

Topside Design Data Requirements Worksheet

Item	Data Element	Data Required from SPM Prior to System Contract Development (New or Mod) per Ship Class										Notes
		PARMs	PMS 312	PMS 317	PMS 325	PMS 377	PMS 378	IWS 1.0	PMS 470	PMS 490	PMS 500	
1 Constraints/Interfaces												
1.1	Maximum dimensions											
1.2	Available hotel services margins											
1.3	Maintenance or Manpower Constraints/Limitations											
2 Signature Limitations												
2.1	RCS											
2.2	IR											
2.3	Acoustic											
2.4	Magnetic											
2.5	Visual											
3 EME/EMI/EMC												
3.1	Max specified EME											
4 Environmental Requirements												
4.1	Humidity											
4.2	Temp											
4.3	Greenwater Loading											
4.4	Blast/Thermal											
4.5	Stack Gas											
4.6	Rotor Backwash											
47	Dust/Sand											
4.8	Corrosion Resistance											
5 Shock Requirements												
6	Vibe Limitations											
7 Weight and Moment Limitations												
8 Survivability Requirements												
8.1	Over-pressure/ Nuclear and non-nuclear											
8.2	EMP											
9 Flight Ops Environmental Limitations												
9.1	Jet Blast											
9.2	Helo Down-wash											
10 Material Limitations/Expectations												
11	Safety Limitations											
12	Max cable length acceptable											

Topside Design Data Requirements Worksheet

Item	Data Element	Topside Designer Provide to SPM Prior to Preliminary Arrangement Decision												Notes
		PARMs	PMS 312	PMS 317	PMS 325	PMS 377	PMS 378	IWS 1.0	PMS 470	PMS 490	PMS 500	PMS 501		
Arrangement Option Summary and Recommendation														
1	1.1 Blockage analysis													
	1.2 EMi impact assessment													
	1.3 Verify clearances													
	1.4 Navlight impact													
	1.5 Untrap impact													
	1.6 Line handling/mooring impact													
	1.7 Flight deck/aviation systems impact													
	1.8 Aircraft parking spot impact													
	1.9 Comm system impact													
	1.10 Combat system impact													
	1.11 Signatures impact													
	1.12 Watch station impact													
	1.13 Structural feasibility													
	1.14 Weight/moment check													
	1.15 P&FCO check													
	1.16 RADHAZ Analyses/checks (HERO/HERP/HERF)													

Topside Design Data Requirements Worksheet

Item	Data Element	PARM to Provide SPM Prior to Preliminary Arrangement Decision										Notes
		PARMs	PMS 312	PMS 317	PMS 325	PMS 377	PMS 378	IWS 1.0	PMS 470	PMS 490	PMS 500	
1	DD 1494 submittal or approved J/F 12											
2	Antenna type and description											
3	Preliminary Physical Parameters											
3.1	Weight											
3.2	Dimensions of radome and foot print											
3.3	Antenna and pedestal dimensions											
3.4	Electrical loads											
3.5	Cooling loads											
3.6	Pressurized air											
3.7	Platform stiffness/resonant freq reqts											
4	Required Coverage (Az, El)											
5	Maintenance Access requirements											
5.1	General Description											
5.2	Height											
5.3	Width											
5.4	Length											
6	Clearance/Volume											
6.1	Restricted zones											
6.2	Height											
6.3	Width											
6.4	Length											
7	Cable/waveguide length restrictions											
8	Minimum Height AWL											
9	Antenna Characteristics (if not on DD1494)											
9.1	Mainbeam gain											
9.2	Antenna pattern data											
9.3	Polarization											
9.4	Beamwidths (AZ, EL)											
10	Transmitter Characteristics (if not on DD1494)											
10.1	Peak output power											
10.2	Duty factor or average power if applicable											
10.3	Freq range											
10.4	Bandwidth											
10.5	Spurious Emissions and Broadband Noise											
10.6	Modulation											
10.7	Harmonics and Intermodulation Distortion											
11	Receiver Characteristics (if not on DD1494)											
11.1	Sensitivity											
11.2	Freq range											
11.3	Bandwidth											
11.4	Spurious Response											
11.5	Image Response											
11.6	Burnout Threshold											
11.7	Receiver Selectivity											

Topside Design Data Requirements Worksheet

Item	Data Element	PARMs	PMS 312	PMS 317	PMS 325	PMS 377	PMS 378	IWS 1.0	PMS 470	PMS 490	PMS 500	PMS 501	Notes
12	Environmental Survivability Limits												
12.1	Overpressure (static and dynamic)												
12.2	Temperature limits												
12.3	Vibration limits												
13	System Specifications												

PARM to Provide SPM Prior to Final Arrangement Decision														
3														
1	EMI/EMC Test Results (Model and/or MIL-STD-461 Test Results)													
2	RCS Cert Letter													
2.1	Modeling													
2.2	Test and Evaluation													
2.3	Mitigation													
3	Shock and Vibration Test Qualification													
4	Footprint Data													
5	ICDs													

Topside Designer Provide to SPM Prior to Final Arrangement Decision															
Topside Designer Report															
1	Integrated Topsid e Design Report	All of the below, but focused on specific location, include details where appropriate, including all computer analyses, tests, etc.													
1.1	Blockage analysis														
1.2	EMI impact assessment														
1.3	Verify clearances														
1.4	Navlight impact														
1.5	Unrep. impact														
1.6	Line handling/mooring impact														
1.7	Flight deck/aviation systems impact														
1.8	Aircraft parking spot impact														
1.9	Comm system impact														
1.10	Combat system impact														
1.11	Signatures impact														
1.12	Watch station impact														
1.13	Structural feasibility														
1.14	Weight/moment check														
1.15	P&FCO check														
1.16	RADHAZ checks														

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1	Location Approval Letter												
2	Blockage Analysis												
3	Structural Analysis												
3.1	Shock and Vibration												
3.2	Weight and Moment												
3.3	System Stability												
3.4	Static and Fatigue Strength (Fit Deck, Tiedowns, Etc)												
4	EMI/EMC Analysis												
4.1	Source and Victim Analysis												
4.2	Brass Model Study												
4.3	RADHAZ												
4.4	EMI Mitigation Analysis												
4.5	Antenna Coupling/Separation Analysis												
5	Special Studies												
5.1	Blast/Overpressure												
5.2	Temperature Effects												
5.3	Weapon System Impacts												
6	RCS Cert Letter												
ShipAlt Documents Required Prior to Installation													
1	SCD (Ship Change Document)												
3	SID												
4	ILS Cert												
5	ICDs												
Certifications Required Prior to Ship Deployment													
1	System EMC Cert												
2	NAVAR Certs												
3	P&FCO												
4	RADHAZ Cert												
5	etc.....												

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